Taxonomic status and Australian distribution of the weedy neotropical grass *Leptochloa fusca* subsp. *uninervia*, with an updated key to Australian *Leptochloa* (Poaceae, Chloridoideae)

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Summary

Snow, Neil & Simon, Bryan K. (1999). *Austrobaileya* 5(2): 299–305. The neotropical grass *Leptochloa fusca* subsp. *uninervia* is reported for the first time in Queensland, Western Australia, Northern Territory, South Australia and Tasmania, and its weedy tendencies are discussed. A brief overview is given regarding the taxonomy of *Leptochloa*, including why *Diplachne* P. Beauv. is no longer recognised, and of the *L. fusca* species complex. An updated key is provided for the fourteen confirmed taxa of Australian *Leptochloa*.

Keywords: *Leptochloa*, Poaceae, Chloridoideae, Australia, weediness, systematics.

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Introduction

During fieldwork in April of 1996 in Bowen, Queensland, we encountered a large population of the neotropical grass *Leptochloa fusca* (L.) Kunth subsp. *uninervia* (J. Presl) N. Snow. Until recently (Snow 1997a, 1998; Snow & Davidse 1998) this taxon was recognised as a distinct species (Gould 1975; McVaugh 1983; Nicora 1995; Snow 1996). Prior to this report *L. fusca* subsp. *uninervia* was only known in Australia from a single collection in New South Wales (Jacobs & McClay 1993). Recent monographic work on the genus worldwide (Snow 1997a) has confirmed its presence in the Australian states of Queensland, Western Australia, Northern Territory, South Australia and Tasmania. Before discussing the weedy properties and distribution of this taxon, a brief discussion is necessary regarding the systematics of the genus, and of the species complex to which *L. fusca* subsp. *uninervia* belongs.

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Systematics of *Leptochloa* sensu lato

Leptochloa sensu lato frequently has been split by Australian, African, and South American workers into *Leptochloa* s.s. and *Diplachne* P. Beauv. (Simon 1993; Gibbs-Russell et al. 1991; Nicora 1995). However, since cladistic studies consistently rejected the null hypothesis that *Diplachne* represents a monophyletic clade distinct from *Leptochloa, Diplachne* has been reduced to synonymy under *Leptochloa* (Snow 1997a, 1998).

Systematics and nomenclature of the *Leptochloa fusca* complex

Leptochloa fusca subsp. *uninervia* belongs to the highly polymorphic species *L. fusca*, which occurs worldwide in warm temperate and tropical regions (Correll & Johnston 1970; Phillips 1974; Lazarides 1980; Stanley and Ross 1989; Scholz and Böcker 1996; Snow 1997a). The nomenclature associated with *L. fusca* has been tortuous and ambiguous. A few authors have begun using the epithet '*malabarica*' rather than the much more widely

known '*fusca*', and for this reason rejection of the epithet '*malabarica*' has been proposed (Snow & Davidse 1998). Morphological forms of *L. fusca* s.l. that appear relatively distinct regionally often have been accorded formal taxonomic recognition at various ranks. Consequently, dozens of names have been given to local forms.

The recent revision of *Leptochloa* (Snow 1997a) reconsidered the systematics of this species group. Included in the re-evaluation were several thousand herbarium specimens from all continents except Antarctica, and fieldwork on three continents (North America, Africa, Australia). Univariate statistical studies of herbarium specimens and population samples from the field (Snow in prep.) were unable to find characters that could consistently diagnose separate species in this group by ordinary morphological means (Snow 1997b), with the exception of the rare African species *Leptochloa gigantea* (Launert) T. A. Cope & N. Snow. However, multivariate statistical studies (Snow in prep.) of population samples (n=20) from the USA, Mexico, Botswana, Namibia, and Australia, supported recognition of four subspecies, given a general tendency of populations to segregate into four entities. Of the four recognised subspecies (Snow 1997a), three occur in Australia, including *L. fusca* subsp. *uninervia, L. fusca* subsp. *fusca* (into which *Diplachne parviflora* (R. Br.) Benth. and *Diplachne reptatrix* (L.) Druce have been synonymised), and *L. fusca* subsp. *muelleri* (Benth.) N. Snow (Snow 1998).

Weediness and geographical distribution of *Leptochloa fusca* subsp. *uninervia*

The occurrence of *Leptochloa fusca* subsp. *uninervia* should be of interest to the agricultural community in Australia. Like several other species in the genus, *L. fusca* subsp. *uninervia* has pronounced weedy tendencies (Häfliger & Scholz 1981: 98; McIntyre et al. 1988) and frequently can be seen growing in mesic soils of agricultural crops (Snow pers. obs.). Given the high vagility and high germination rates of seed in the genus (Snow unpubl.), *L. f.* subsp. *uninervia* has the potential to spread rapidly within Australia as a weed. This potential is made even more likely by its remarkable salinity tolerance (McVaugh 1983; Jacobs & McClay 1993) and its ability to grow in seasonally inundated habitats, properties common to the species complex to which it belongs (Snow 1997a). Since the seed can overwinter in the soil under normal conditions in a continental climate at ca. latitude 39°N in St. Louis, Missouri (Snow pers. obs.), its weedy potential in Australia probably covers the entire continent at lower elevations. The related and morphologically variable *Leptochloa fusca* subsp. *fusca* has been amply documented as a weed of rice crops in Australia (McIntyre 1985; McIntyre et al. 1989). *Leptochloa fusca* subsp. *uninervia* commonly grows in semi-disturbed, seasonally inundated locations, and thus is found frequently in roadside ditches, along sandbars of streams and smaller rivers, and in mesic agricultural situations. Since it does not compete well ecologically with other species, it often occupies somewhat bare areas (Snow pers. obs.). Contrary to the otherwise accurate presentation in Häfliger & Scholz (1981), *Leptochloa fusca* subsp. *uninervia* is often geniculate below and frequently roots at the lower nodes (Snow 1997a). The fringed appearance of the ligule (Häfliger & Scholz 1981) is an artefact of mechanical damage, the undamaged condition being apically attenuated.

The native range of the *L. fusca* subsp. *uninervia* is from the southern third of the United States, the West Indies, and south through Argentina (Gould, 1975; Häfliger & Scholz, 1981; Nicora, 1995; Snow 1997a). However, in addition to Australia, this taxon has become introduced in a number of regions, including Saudi Arabia, Egypt, the Canary Islands, and New Zealand (Snow 1997a). Except for the lemma, which is apically attenuate in its undamaged state (Fig 1; shown erroneously as bi-lobed),an excellent illustration of *Leptochloa fusca* subsp.

uninervia from Mason (1957) is reproduced here (Fig. 1.) by permission of the University of California Press (Copyright 1957 by Regents of the University of California; © renewed 1985 by Herbert Mason). In the New World *L. fusca* subsp. *uninerva* is commonly called 'Mexican Sprangletop' (Gould, 1975: 229), 'Zacate Salado Mexicano', or 'Zacate Gigante Peruano' (Beetle et al., 1991: 291).

The only known previous Australian collection (Jacobs & McClay, 1993) was in August of 1992 from the Newington Naval Arms Depot, Homebush Bay, on the central coast of New South Wales (*Jacobs* 6546, NSW).

***Additional Australian localities*: Queensland.** North Kennedy District: Bowen, in ditches along roadside; locally common in shallow water; GPS 20°00'35", 148°13'40" E; 13 April 1996, *Snow* 7387 & *Simon* (BRI, MO, NE and duplicates to be distributed). Port Curtis District: Awonga Dam, Iveragh Reach, 15 km SE of Calliope, *Gibson* TO1347 (BRI). South Kennedy District: Munbura Road, Alligator Creek Mackay, 17 Nov 1994, *Tilley s.n.* (BRI). **New South Wales.** Newington Naval Arms Depot, Homebush Bay, *Jacobs* 6546 (NSW). **Western Australia.** Tank near Milbillillie H/S, *Craven* 5383 (CANB,MO); Kimberley Research Station, Kununurra, *Parker* 471 (BRI); Carawine Gorge, ca 140 km SE of Shay Gap, *Newbey* 10463 (CANB); Corong Creek, Woodstock Station, S of Port Hedland, *Burbidge* 58454 (CANB); Department of Agriculture Experimental Farm, Kununurra, *Gilbey s.n.* (CANB). **Northern Territory.** Elparpa Swamp, *Latz* 7607 (NSW); Palm Valley, 12 mi SW of Hermannsburg, Mission, *Lazarides* 5290 (NSW). **South Australia.** Barker Inlet South Wetland, Wingfield, Adelaide, 8 Apr 1997, *Green* 1988 (BRI). S.A. Water's Bolivar Sewage Treatment Works, Bolivar & St. Kilda, Adelaide, 8 Apr 1997, *Green* 1993 (BRI). **Tasmania.** Woodbury, *Black* 1270.635 (CANB, MO).

Synopsis and key to Australian *Leptochloa* (sensu Snow 1997)

With the recent discovery of the new species *Leptochloa southwoodii* in Queensland (Snow & Simon 1997), a first record of *L. panicea* subsp. *panicea* from Mt. Isa (Snow 1997a), and this report of *L. fusca* subsp. *uninervia*, the number of taxa in *Leptochloa* for Australia stands at fourteen. Details regarding nomenclature and synonymy will be published in the future (or see Snow 1997a). Taxa in the following key with an asterisk are adventive in Australia.

1. Panicle branches digitate or subdigitate 2
   Panicle branches not digitate or subdigitate 3

2. Culms 'woody'; leaf blades deciduous at base ..... **L. digitata**
   Culms not 'woody'; leaf blades not deciduous at base ..... **L. dubia***

3. Hidden inflorescences in axils of sheaths present ..... **L. dubia***
   Hidden inflorescences in axils of sheaths absent 4

4. Spikelets one-flowered ..... **L. neesii**
   Spikelets two- or more-flowered 5

5. Ligule apex (undamaged) attenuate, mostly 5 mm or more long 6
   Ligule apex (undamaged) truncate, mostly shorter than 5 mm (except *L. southwoodii* and *L. ligulata*) 8

6. Lowermost panicle branches not exserted at maturity; uppermost leaf blade often exceeding length of panicle; lower portion of leaf sheaths often mottled purple; lemma often smoky white at maturity with a darker area covering the caryopsis; marginal hairs of lemma often strongly divergent at maturity ..... **L. fusca** subsp. **muelleri**
   Lowermost panicle branches exserted at maturity; uppermost leaf blade exceeding length of panicle; lower portion of leaf sheaths usually not

mottled purple; lemma colour various, but generally not smoky white with a darker area; marginal hairs of lemma not strongly divergent at maturity 7

7. Lemma apex obtuse to truncate, often notched and mucronate; lemma dark green or lead coloured; panicles generally completely exserted from sheaths, narrowly elliptic to elliptic in profile; panicle branches held at greater than 45° angle, often greater than 30 branches in number; anthers usually less than 0.5 mm long ..... **L. fusca** subsp. **uninervia***
Lemma apex usually acute or acuminate, notched or not, mucronate or not; lemma generally not dark green or lead coloured; panicles sometimes not completely exserted, often broader than elliptic in profile; panicle branches sometimes held at less than 45° angle, frequently fewer than 30 branches in number; anthers usually 0.5–2.5 mm long ..... **L. fusca** subsp. **fusca**

8. Panicle apex erect; mature panicle branches (10-) 15–30 cm long and divergent or reflexed; spikelets mostly distant ..... **L. divaricatissima**
Panicle apex usually somewhat nodding; mature panicle branches mostly less than 15 cm long, the branches only rarely divergent or reflexed; spikelets generally somewhat overlapping 9

9. Leaf sheaths with tubercule-based pilose hairs 10
Leaf sheaths lacking turbercule-based pilose hairs 14

10. Leaf blades covered with sericeous or tomentose hairs; lower half of lateral nerves of lemma densely sericeous, the hairs increasingly divergent at maturity ..... **L. decipiens** subsp. **peacockii**
Leaf blades glabrous; lower half of lateral nerves of lemma hairy or not, but not with widely divergent hairs 11

11. Plants over 100 cm tall; hairs on leaf sheaths more or less dense and occurring throughout sheath; ligule apex sometimes notched at the middle .... **L. southwoodii**
Plants (in Australia) mostly under 100 cm tall; hairs on leaf sheaths erratic, often most dense near sheath apex; ligule apex not clearly notched at the middle 12

12. Culms wiry; panicle branches generally naked along lowest 2 mm; leaf blades generally lacking a distinct midvein on upper surface (or, if so, only occurring at very base) ..... **L. decipiens** subsp. **asthenes** (formerly known as **L. ciliolata**)
Culms not wiry; panicle branches bearing one or more spikelets along lowest 2 mm; leaf blades with a distinct midvein on upper surface 13

13. Caryopsis with a shallow groove and somewhat laterally compressed, the apex often broadly acute; lower lemma mostly more than 1.3 mm long, mostly glabrous between midnerve and lateral nerves .....
..... **L. panicea** subsp. **brachiata*** (formerly known as **L. mucronata**)
Caryopsis lacking shallow groove and mostly terete in cross section, the

apex obtuse but never acute; lower lemma mostly less than 1.2 mm long, glabrous or hairy between midnerve and lateral nerves ..... **L. panicea** subsp.**panicea***

14. Plants perennial; ligules 0.9–1.7 mm long, apex erose but not notched near centre ..... **L. decipiens** subsp. **decipiens**
Plants annual; ligules 4.2–7 mm long, sometimes with a central notch at the apex ..... **L. ligulata**

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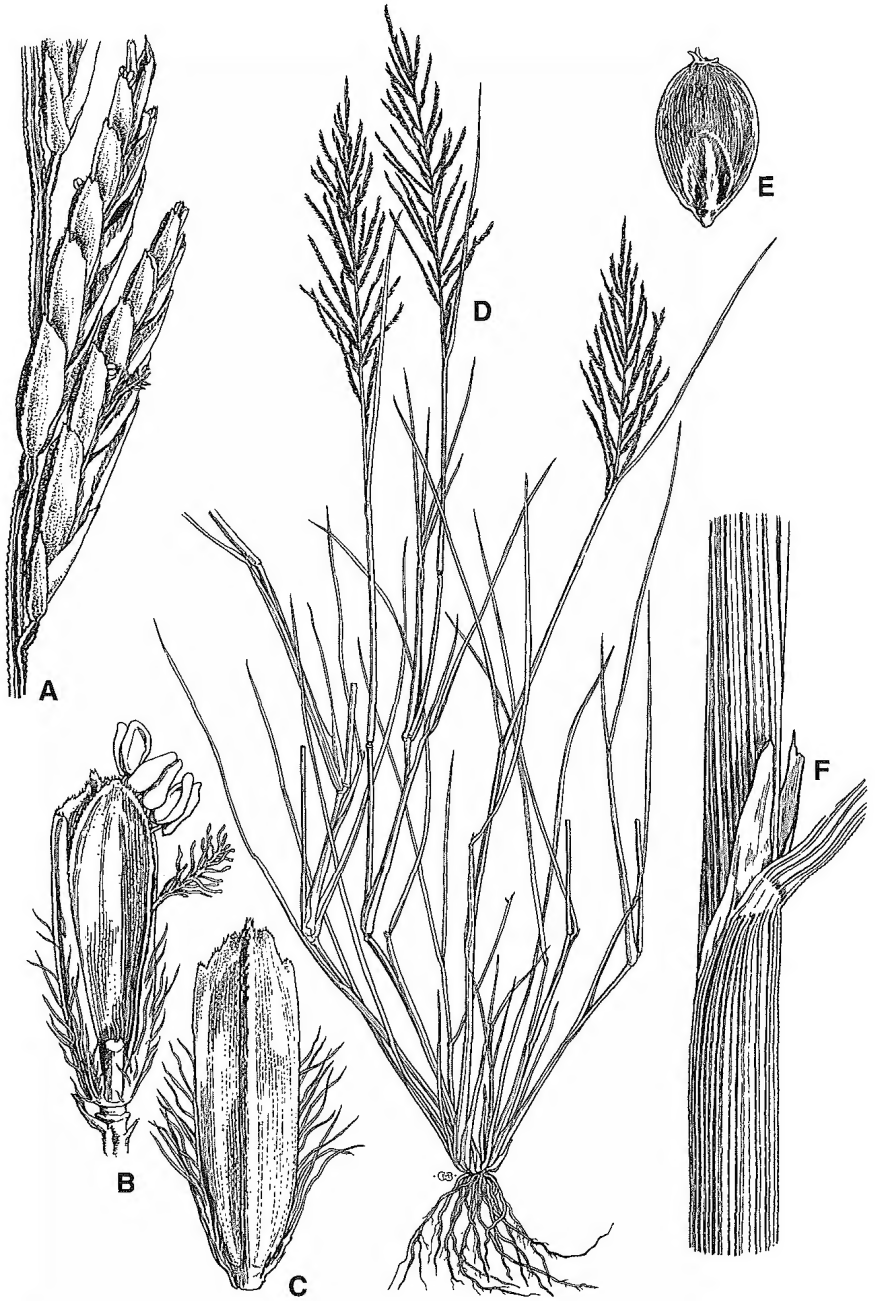

Fig. 1. ***Leptochloa fusca*** **subsp.** ***uninervia*** (J. Presl) N.Snow: *a*, spikelets; *b* and *c*, floret, showing palea and the somewhat truncated lemma apex, the marginal nerves pubescent below; *d*, habit, *e*, grain, *f*, leaf sheath and the ligule (shown as bilobed; typically it is attenuate in undamaged condition). Reproduced with permission of the University of California Press from Mason (1957)